

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/672,116	KALE ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Ella Colbert	3624	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 15 September 2005.
2. ☒ The allowed claim(s) is/are 1,5,6,8,12 and 13.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☒ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date 10/18/05.
- Identifying Indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |  |  |
|--|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date <u>10/18/05</u> | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                    |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material                               | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance   |
|  | 9. <input type="checkbox"/> Other _____.   |

### **DETAILED ACTION**

1. Claims 1, 5, 6, 8, 12, and 13 have been amended in this communication filed 09/27/05 entered as Response After Non-Final Action, Change in Power of Attorney, and Correspondence Address Change.

### ***Drawings***

2. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the present drawings are informal. In particular Drawing figures 1-

3. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

### **EXAMINER'S AMENDMENT**

3. An Examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to Applicants', and amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this Examiner's amendment was given in a telephone communication by Mr. Jivendra K. Kale on 10 October 2005.

### **In the claims**

4. Claim 1 A computer-implemented method of allocating investment funds to a plurality of assets to construct an investment portfolio having a utility defined by at least

a first function  $U_1$  for positive rates of returns and a second function  $U_2$  for negative rates of returns, the computer-implemented method comprising:

selecting a plurality of assets in the portfolio;

and allocating the investment funds to the said plurality of assets to maximize an expected utility of the investment portfolio; wherein the at least first function  $U_1$  is a log-utility function wherein said log-utility function is at least characterized by the following:

$$U_1 = 1 + \ln(1+r) \text{ for } r \geq 0$$

where  $U_1$  presents the portfolio's utility to the portfolio holder,  $r$  represents the portfolio's return, and  $\ln$  is a symbol for natural logarithm, and wherein the at least second function  $U_2$  is a power-utility function wherein said power-utility function is at least characterized by the following:

$$U_2 = \frac{1}{Y} [(1+r)^Y + Y - L] \text{ for } r < 0$$

where  $U_2$  represents the portfolio's utility to the portfolio holder,  $r$  represents the portfolio's return, and  $Y$  represents the loss-aversion of the portfolio holder and has a value of less than or equal to 0.

Claim 8. A computer system for allocating investment funds to a plurality of assets to construct an investment portfolio having a utility defined by at least a first function  $U_1$  for positive rates of returns and a second function  $U_2$  for negative rates of returns, the computer system comprising:

a processor; and

a memory coupled to the processor, said memory storing a plurality of code modules for execution by the processor, the plurality of code modules comprising;

a code module for selecting a plurality of assets in the portfolio; and

code modules for allocating the investment funds to the said plurality of assets to maximize an expected utility of the investment portfolio; wherein the at least first function  $U_1$  is a log-utility function wherein said log-utility function is at least characterized by the following:

$$U_1 = 1 + \ln(1+r) \text{ for } r \geq 0$$

where  $U_1$  presents the portfolio's utility to the portfolio holder,  $r$  represents the portfolio's return, and  $\ln$  is a symbol for natural logarithm, and wherein the at least second function  $U_2$  is a power-utility function wherein said power-utility function is at least characterized by the following:

$$U_2 = \frac{1}{Y} [(1+r)^Y + Y-L] \text{ for } r < 0.$$

where  $U_2$  represents the portfolio's utility to the portfolio holder,  $r$  represents the portfolio's return, and  $Y$  represents the loss-aversion of the portfolio holder and has a value of less than or equal to 0.

#### Reasons for Allowance

5. Claims 1, 5, 6, 8, 12, and 13 are allowed.

6. The following is an examiner's statement of reasons for allowance: The prior art of record Ohlson, J.A. and Ziemba, W. T.; "Portfolio Selection in a Lognormal Market When the Investor has a Power Utility Function" teaches computation methods to determine optimal portfolio allocations, a power utility function, and an approximate normal or discrete distribution. The method of Ohlson and Ziemba provides a power utility function but fails to provide a method and a system with code modules for allocating investment funds to a plurality of assets to construct an investment portfolio having a utility defined by at least the first function  $U_1$  for positive rates of returns and a second function  $U_2$  for negative rates of returns, allocating the investment funds to the plurality of assets to maximize an expected utility of the investment portfolio; wherein the at least first function  $U_1$  is a log-utility function wherein the log-utility function is at least characterized by the following:  $U_2 = \frac{1}{Y} [(1+r)^Y + Y-L]$  for  $r < 0$ ; where  $U_2$  represents the

Y

portfolio's utility to the portfolio holder,  $r$  represents the portfolio's return, and  $Y$  represents the loss-aversion of the portfolio holder and has a value of less than or equal to 0

Even though, the prior art teaches a method for providing a power utility function, the prior art of record fails to teach a method and a computer system for allocating investment funds to a plurality of assets to construct an investment portfolio having a utility defined by at least a first function and a second function. For these reasons claims 1 and 8 are deemed allowable over the prior art of record, and claims 5, 6, 12 and 13 are allowed by dependency.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

7. Other prior art made of record and not relied upon that is considered pertinent to applicant's disclosure.

Sercu, Piet disclosed a real mean-variance-efficient portfolio and a nominally efficient portfolio.

Melnikoff (US 5,784,696) disclosed portfolio theory and quantitative analysis.

Satoshi (JP406295300A) disclosed an optimum portfolio calculated based on stored data.

Copland, Thomas E. and Weston, J. Fred disclosed a power utility function and risk aversion.

Elton, Edwin J. and Gruber, Martin J. disclosed a log utility function.

Hakansson, Nils H. disclosed utility functions and convergence in multiperiod portfolio choice.

Francis, Jack Clark and Archer, Stephen H. disclosed linear transformations of utility functions and utility maximization.

Markowitz, Harry disclosed portfolio selection and the return on the portfolio as a weighted sum of random variables.

Kale, Jivendra K., Ph.D. (Applicant of instant application) disclosed growth optimization with downside protection as a portfolio selection technique based on Power-log utility functions that combine the goal of long term portfolio growth maximization.

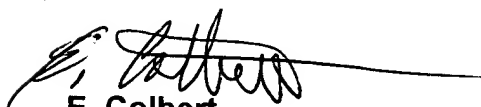
Best, M. J. disclosed a nonlinear programming function.

### **Inquiries**

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ella Colbert whose telephone number is 571-272-6741. The examiner can normally be reached on Tuesday-Thursday, 6:30AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vincent Millin can be reached on 571-272-6747. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**E. Colbert**  
**Primary Examiner**  
October 17, 2005